

SAE – Automation, s.r.o. Nová Dubnica
Solid And Effective partner at development of your
products and industry automation

Flexible system for data acquisition, processing, archiving, reporting, logging, launching of external programs and scripts...

Where OpcDbGateway can be used:



OpcDbGateway represents a software product that can be categorized as a SCADA system (System Control and Data Acquisition). The basic feature is the data acquisition from external

devices (sensors, actuator, programmable controllers...), data processing, data storage in process databases and files, delivery of processed data to other applications. The system by its structure, based on parallel event data processing, periodical or single-shot launching of external programs and scripts at specified time, allows the user to build simple or complex applications for data mining and processing, logging, alarms, generating printed reports, control and monitoring of processes and communication infrastructure in a user-friendly and easy way.

Industrial company unit/plant with more technological units controlled by own programmable logical controllers (PLC) from various vendors from which it is necessary to transfer acquired data into a corporate information system, store in database, visualise on **intranet** or **internet**, store information about alarms, call maintenance in case of a malfunction, store processed data in log files, analyse measured data trends for **maintenance** planning with the help of algorithms configured directly in OpcDbGateway or by launching an external program, **monitor and log maintenance incidences**, **monitor and control the communication infrastructure** (switches, routers, computers, WiFi devices) that means data transfer between technological units and the corporate information system...

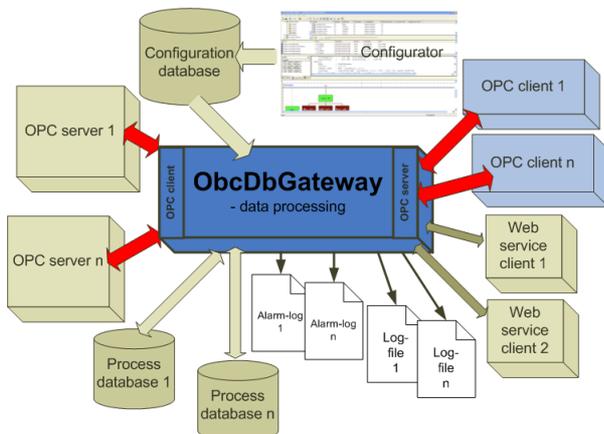


Fig. 1: **Data processing with the help of OpcDbGateway**

The system uses three basic software technologies of data transfer: OPC (Open Process Control), various database drivers and web services.

Its access via web services allows to use it within service oriented architecture (SOA).

It allows the creation of even relative complex systems with a great number of processed data by using an easy configuration instead of extensive programming. Besides number of commands available for the configuration of process databases, it uses also SQL language for programming extensive database operations.

A building in that many sensors (temperature, humidity, ...) are installed, it is necessary to control the air conditioning, analyse access to particular rooms...

A machine or technological device that is necessary to monitor and control and where sensors and actuators of various vendors are used.

Testing of complex algorithms programmed with the help of specialised software utilities for modelling and simulation of dynamic systems and their interconnection with real data from/to a technological process.

Data cross connection of different application that have an OPC client interface.

It is possible to launch OpcDbGateway on any device that can run MS Windows, that means not only standard but also industrial computers. **Interoperability** of this system with many other platforms and systems is ensured by utilizing web services.

OpcDbGateway software package consists of:

- **configurator** with user interface for creation, debugging and eventually monitoring of application configuration
- **„runtime“** without user interface (implemented as NT service or as out of process server – exe that ensures the execution of all tasks defined in the application's configuration (project)

„Runtime“ consists of **internal OPC client**, implemented according to OPC DA 3.0 standard that cooperates with **external OPC servers**, synchronous controller (SoftPLC), that is processing data within parallel running tasks, and **internal OPC server**, implemented according to standards OPC DA 3.0, OPC AE 1.1 and OPC XML DA. The OPC server provides processed data to other external applications via **OPC interface** or **web services**. To access databases the runtime makes use of various drivers such as ODBC or other drivers that are available the operating system.

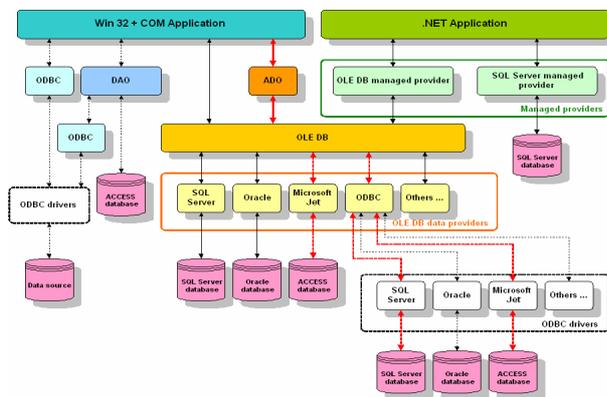


Fig 2: OpcDbGateway database access

OpcDbGateway implements various alarm systems – basic, based on the implementation of OPC AE 1.1. standard and enhanced that allows many operations to be performed based on various events, for example logical operators above multiple input variables, alarm status logging, database operations, etc. Enhanced alarm systems is shipped together with ActiveX controls for alarm management. It is possible to configure alarm log files archive, creation of new log files in a defined time or with a defined time period.

OpcDbGateway ensures the **data persistency** – that means after a restart, if necessary, it uses data stored before application shutdown. It watches the **usage of own resources** such as virtual memory, disk space for logs, reports, database, power source.

Messages stored in a log file or in a database can be saved in **multiple languages** and it is possible to define **what values should be contained in a report**.

Configuring OpcDbGateway

To configure OpCDBGateway it is necessary to perform four steps as follows:

1. definition of external OPC servers and data processed by them
2. definition of particular process databases, ways of accessing them and their structure
3. definition of operations that should be executed together with data in synchronous controller
4. definition of internal OPC server's address space

The configuration of external OPC server that provides data to/from a device can have a great number of variables. To transfer these variables into OpcDbGateway configuration, it is possible to use the in-built **external OPC server configuration mapping** function and this way to save lot of work.

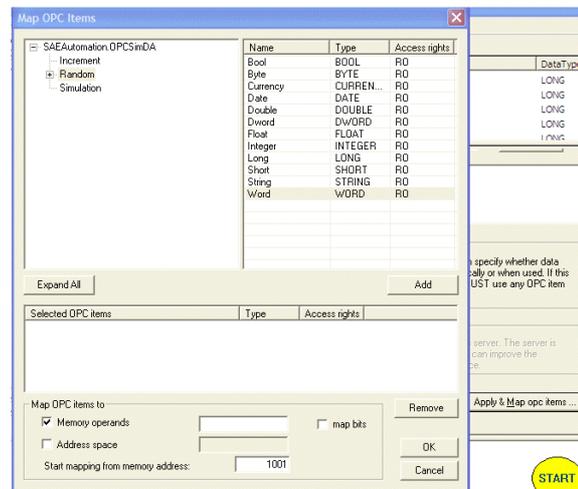


Fig 3 – Mapping external OPC server address space into OpcDbGateway configuration

Acquiring data from external OPC servers is possible by scheduled reading or using notifications, in the latter case the transfer takes place only in the case of a relevant data modification. The data from external OPC servers are mapped in so called **memory operands**, for further processing in **synchronous controller** and also if a transfer is requested without previous processing, directly into address space of the internal OPC server. SoftPLC works also with **database operands** matching particular process **database values**, entire columns in the table or

even entire tables. Commands are executed over *memory* and *database operands*. Such command can have maximum of two input and one output operand. The output operand can be again a *memory* or *database* operand.

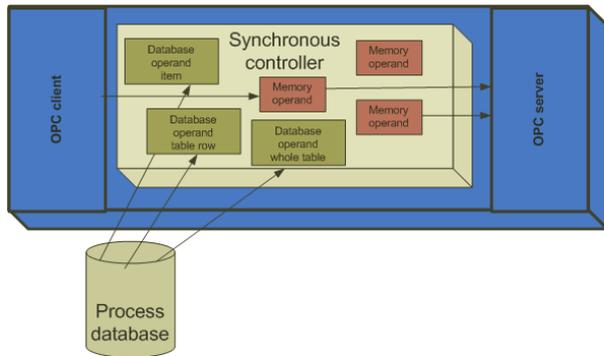


Fig 4 – SoftPLC works with *memory* and *database operands*

The commands can be grouped in functional blocks. A functional block can be executed in each SoftPLC cycle – *main* block, one-time after start, restart, application shutdown or triggered by a timer, periodically at a scheduled time that is different from main SoftPLC period. A special type of commands is represented by SQL commands that work directly with process databases without using database operands.

The configuration structure consisted of individual functional blocks can be displayed in graphics directly in the configurator. By clicking on particular block it is possible to enter the edit mode of such block.

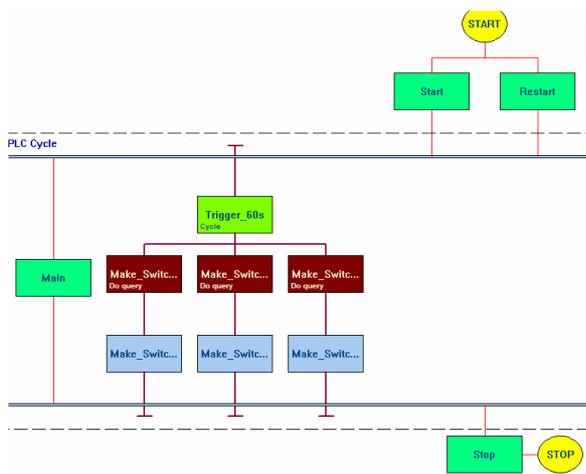


Fig 5 – Graphical configuration viewer

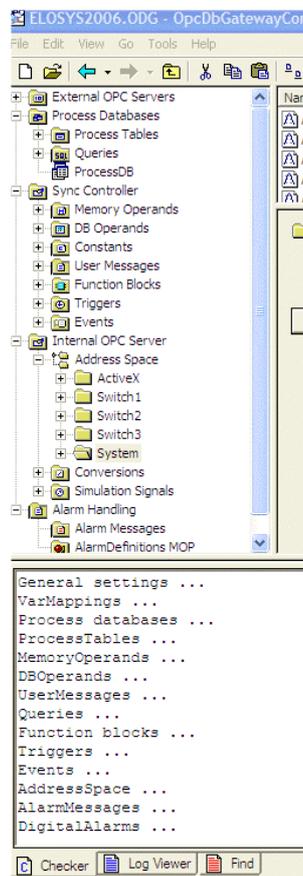
Functional blocks can be nested and can have a priority of processing set. It is possible to execute number of arithmetical, trigonometrical, logical and statistical operations over operands. To database commands belongs also, for

example, generating of current trend, statistical functions, extrapolation and search functions. The structure of process databases, their individual tables it's possible to create in the configurator as well.

It is possible to execute functional blocks synchronously within SoftPLC period, to ensure input data persistency, or asynchronously independent on main SoftPLC period, eventually in shorter period. The launch of an asynchronous functional block is executed immediately apart from synchronous that is waiting to synchronise with the main SoftPLC period. In the graphical viewer the synchronous functional blocks executed within main SoftPLC period are distinguished by placing double horizontal lines representing this period.

Testing OpcDbGateway configuration

After project configuration with the help of OpcDbGateway configurator it is possible to perform a syntax check of entire configuration. It is possible to jump to an error directly from the list of detected configuration errors..



A running application can be tested in two ways – by using an in-built OPC client in the configurator, that is able to monitor the status of all OPC variables of the internal OPC server, including system variables that inform about application activity or with the help of messages stored in external log files. The range of logged information in log files and their file size can be configured. It is possible to log in detail the information about each executed operation, its duration, values of operands or to log just malfunction states of the OpcDbGateway system. User defined

messages can be written into the log file too.

| Item ID | Value | Timestamp | Quality | Subquality | Limit |
|--------------------------------|----------------------------|-----------------------|---------|--------------|-------------|
| System_PlcLineStatus | 1 (VT_I2) | 09/22/06 14:01:02.765 | Good | Non-specific | Not Limited |
| System_PlcAvailableMemory | 0 (VT_R8) | 09/22/06 14:00:53.671 | Good | Non-specific | Not Limited |
| System_PlcBatteryFlag | 1 (VT_I2) | 09/22/06 14:01:02.765 | Good | Non-specific | Not Limited |
| System_PlcBatteryFullLifeTime | -1 (VT_I2) | 09/22/06 14:01:02.765 | Good | Non-specific | Not Limited |
| System_PlcBatteryLifePercent | 100 (VT_I2) | 09/22/06 14:01:02.765 | Good | Non-specific | Not Limited |
| System_PlcBatteryLifeTime | -1 (VT_I2) | 09/22/06 14:01:02.765 | Good | Non-specific | Not Limited |
| System_PlcCycle | 31 (VT_I4) | 09/22/06 14:01:55.796 | Good | Non-specific | Not Limited |
| System_PlcCycleLimitCounter | 0 (VT_I4) | 09/22/06 14:01:02.859 | Good | Non-specific | Not Limited |
| System_PlcCycleLimitPercent | 0 (VT_R4) | 09/22/06 14:01:02.859 | Good | Non-specific | Not Limited |
| System_PlcCycleMax | 110 (VT_I4) | 09/22/06 14:01:53.875 | Good | Non-specific | Not Limited |
| System_PlcCycleMin | 31 (VT_I4) | 09/22/06 14:01:02.859 | Good | Non-specific | Not Limited |
| System_PlcLastErrorDescription | "E 2006-09-22 14:02:00..." | 09/22/06 14:02:00.796 | Good | Non-specific | Not Limited |

Fig 7.: Monitoring internal OpcDbGateway state

| Log file | TotalPhys | AvailPhys | TotalPageFile | AvailPageFile |
|-------------------------|-----------|-----------|---------------|---------------|
| Log File | 508 MB | 49 MB | 1227 MB | 752 MB |
| START_060922_140938.log | 2047 MB | 1868 MB | | |

PRODUCT : OpcDbGateway
 Name : OpcDbGateway
 Version : 3.00.00
 Company name : SAE - Automation, s.r.o.
 Copyright : Copyright© SAE - Automation, s.r.o. 2003 - 2004. All rights reserved.
 Modul file name : C:\Program Files\SAE - Automation, s.r.o\OpcDbGateway\OpcDbGateway

2006-09-22 14:08:38.453 The log file 'STOP_060922_140938.log' was successfully created.
 2006-09-22 14:08:38.453 The location of the file 'STOP_060922_140938.log' is 'C:\P

Fig 8.: Running application logs and viewing a log file in OpcDbGateway configurator

Usage of OpcDbGateway - summary

- Monitoring, management, control, processing and archiving data from technology
- Processing and alarm management
- Generating reports
- Starting external programs
- Data provider between more OPC servers
- Interface between external OPC servers and a database system
- Executing of SQL commands for data manipulation in process databases
- Multiple database connections to process databases at the same time
- Sending of status information about monitored processes via e-mail

OpcDbGateway components and related services provided by our company

1. OpcDbGateway shipments
2. Nonpaid and enhanced paid support for OpcDbGateway users
3. Implementation of control systems and monitoring of technological processes using OpcDbGateway
4. Development of customer functional blocks for OpcDbGateway, for example: regulation algorithms, digital filters, message transport modules (eg. SMS, e-mail, ...)
5. Development of OPC client applications
6. Training courses for new or experienced users
7. Development of OPC servers for various devices.

With the usage of other our applications OPCAdapter for visualisation, SAEAUT SNMP OPC Server for control and monitoring of communication network infrastructure and together with other OPC servers of other vendors it is possible to create a really complex application for control, monitoring, alarming, visualisation, logging and data backup and database replication, printed reports management (see example picture below).

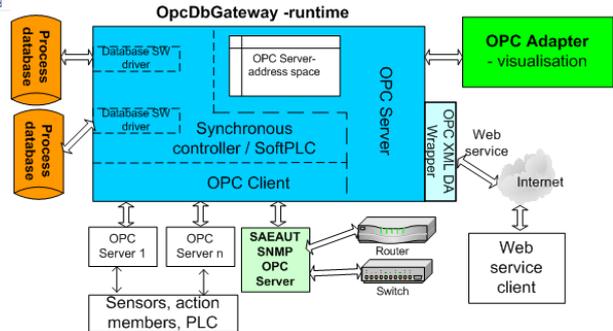


Fig 9: Use of our other applications in a control and monitoring system

How to find us:

